Key Considerations for Developing Climate Adaptation Indicators

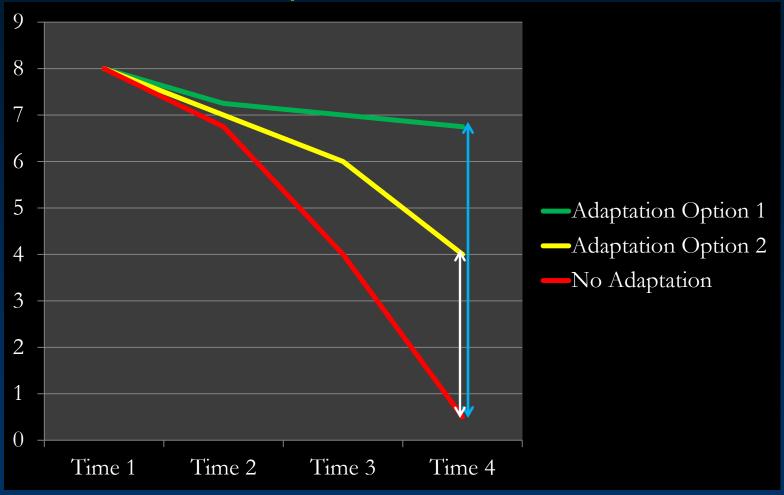
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Conceptual Model for Measuring Adaptation Effectiveness



Effectiveness = difference in indicator value between no adaptation and with adaptation option in place



1. Linking adaptation indicators to specific adaptation objectives

 Open Standards for the Practice of Conservation: metrics linked to the intended conservation objectives



• Climate-smart Conservation: intentional and deliberate



2. Including both process and outcome indicators

- **Process-based indicators**: track such things as progress towards developing and implementing adaptation policies, plans, or strategies
- Outcome-based indicators: measure the vigor with which adaptation actions are implemented and their effect on the targeted systems and resources.



3. Addressing the time lag between adaptation action and measurable changes

- How to attribute observed changes to particular adaptation interventions?
- How to sustain indicator programs over long time periods?



4. Measuring progress relative to future outcomes absent adaptation action

- Counter-factual: expected condition of the target resource in the absence of adaptation (or other intervention)
- How to identify appropriate counter-factuals?
 - Model projections?
 - Comparable area without adaptation intervention?
 - Use vulnerability assessment results?

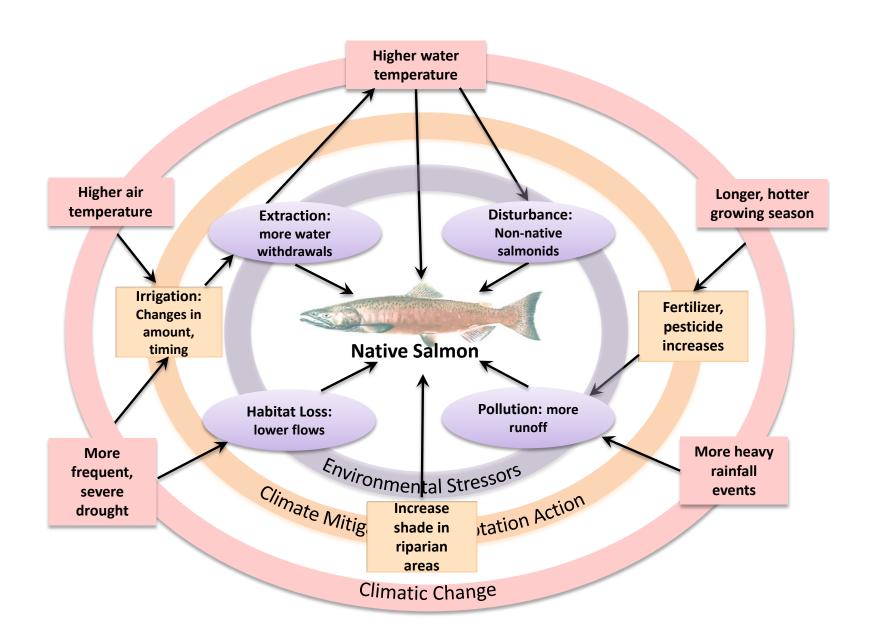


5. Explicitly accounting for effects of other stressors and interventions

- Many factors will affect baseline and project success:
 - Other non-climate stressors (e.g., land use change, climate adaptation in other sectors)
 - Climate mitigation efforts (e.g., renewable energy development)
 - Climate adaptation efforts intended to address other sectors



Staudt et al. (2013) The Added Complications of Climate Change: Understanding and Managing Biodiversity, Ecosystems, and Ecosystem Services under Multiple Stressors. *Frontiers in Ecology and the Environment* (in review).

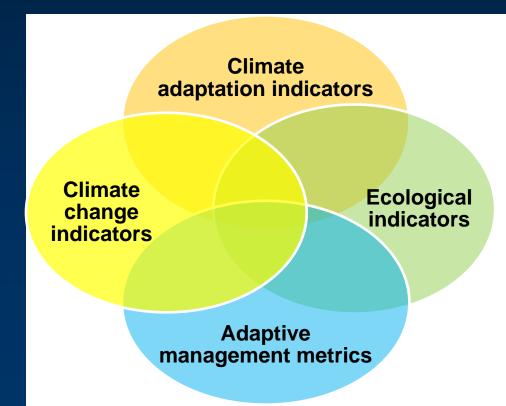


6. Connecting local and broader spatial scales

- Adaptation efforts are local, site-specific
- How to aggregate to a broader spatial scale?
- How to meaningfully compare effectiveness across different locations?



- 7. Integrating adaptation indicators with monitoring strategies that support adaptive management
- 8. Integrating adaptation indicators with ecosystem and climate indicators
 - Limited
 resources/capacity
 for monitoring
 - Where are there potential overlaps in needs?



9. Working with stakeholders to develop climate adaptation indicators

- Adaptation will be implemented by many, many stakeholders working at local levels
- In many cases these local stakeholders will be responsible for documenting/measuring the indicators
- How best to work with these stakeholders to develop adaptation indicator approaches?



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- 2. Including both process and outcome indicators
- 3. Addressing the time lag between adaptation action and measurable changes
- 4. Measuring progress relative to modeled future scenarios absent adaptation action
- 5. Explicitly accounting for effects of other stressors and interventions



Key Considerations for Developing Climate Adaptation Indicators

- 6. Connecting local and broader spatial scales
- 7. Integrating adaptation indicators with monitoring strategies that support adaptive management
- 8. Integrating adaptation indicators with ecosystem climate indicators
- 9. Working with stakeholders to develop climate adaptation indicators

